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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

GARRETT, DAWN L

ART UNIT	PAPER NUMBER
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1774

DATE MAILED: 06/20/2003

4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/993,682

Applicant(s)

LIN ET AL.

Examiner

Dawn Garrett

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 6, 8-18 is/are rejected.
- 7) ☒ Claim(s) 2-5, 7 and 19-21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claims 11 and 19 are objected to because of the following informalities: For purposes of examination, the examiner has interpreted "C₆" to be the luminescent material coumarin 6 dye. Clarification with regard to the abbreviation "C₆" is requested.
2. Claims 8-10 and 13 are objected to because of the following informalities: These claims use unclear Markush language (one of A, B, C, and a combination thereof). The examiner has interpreted the claim as requiring one of any one of the components or a combination of components for the purpose of examination. Either of the following type of formats are suggested:

A) one of A, B, C, **or** a combination thereof

OR

B) one selected from the group consisting of A, B, C, and a combination thereof

Appropriate correction is required.

3. Claim 13 objected to because of the following informalities: It is suggested "composition" be changed to "combination". Appropriate correction is required.

Drawings

4. The corrected or substitute drawing for Figure 6 was received on February 19, 2002. These drawings are approved.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 8, 10, 12, 14, 15, 17, and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Hatwar (US 2003/0068524). Applicant claims a white light emitting organic electroluminescent device (EL) device comprising a substrate, an anode, a hole transporting layer, a luminescent layer comprising a dopant, an electron transporting layer comprising a dopant, and a cathode. Each of the luminescent material and two dopants emit light when the device is applied with a bias voltage. Hatwar discloses a white light-emitting organic EL device comprising an anode, hole transport layer, light-emitting layer doped with a blue light-emitting compound, an electron transport layer doped with a yellow emitting compound and a cathode (see abstract). The doped light-emitting layer and doped electron transporting layer disclosed by Hatwar reads upon the instant "at least one luminescent layer...wherein a first dopant is doped into said luminescent layer" and the "at least one electron transporting layer formed on said luminescent layer". Per instant claim 8, the luminescent medium is disclosed as doped with luminescent blue TBP (see page 6, par. 85). Per instant claims 10 and 12, the electron transporting layer adjacent the luminescent layer is doped with luminescent coumarin dye C545T green dopant in an amount of 0.12% by weight (see TABLE 1, page 7). Per instant claim 14, a preferred embodiment of the device comprises a hole injecting layer between the anode and the hole transporting layer (see page 1, par. 18).

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Per instant claim 15, a preferred embodiment of the device comprises a second electron transport layer between the electron transporting layer adjacent the luminescent layer and the cathode (see TABLE 3, page 8, Device #8). The Hatwar device comprises a substrate adjacent the anode comprised of glass or plastic material (see page 3, par. 54) per instant claim 17. Hatwar discloses the formation of layers as discussed above per instant claim 18. Hatwar discloses all elements of instant claims 1, 8, 10, 12, 14, 15, 17, and 18.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hatwar (US 2003/0068524). Hatwar is relied upon as set forth above for the rejection of claim 1 upon which claim 6 depends. Hatwar teaches a doped luminescent layer with a thickness of 20-100 nm thick, but fails to teach the luminescent layer is in the range from 20 to 150 angstroms (or 2 to 15 nm) as set forth in claim 6. It would have been obvious to one of ordinary skill in the art to have formed a luminescent layer 15 nm thick based upon the teaching by Hatwar of a thickness of 20 nm and have expected similar properties for the luminescent layer, because if the range of prior art and the claimed range do not overlap, obviousness may still exist if the ranges are close enough that one would not expect a difference in properties (see *In re Woodruff*, 16 USPQ 2d 1934

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(Fed. Cir. 1990); *Titanium Metals Corp. v. Banner*, 227 USPQ 773 (Fed. Cir. 1985); *In re Aller*, 105 USPQ 233, 255 (CCPA 1955)).

9. Claims 9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatwar (US 2003/0068524) in view of Fukuoka (US 2002/0168544). Hatwar is relied upon as set forth above for the rejection of claim 1 upon which claims 9 and 13 depend and the rejection of claim 8 upon which claim 9 depends. Hatwar teaches a white light-emitting device comprising a dopant in the luminescent layer, but fails to teach one of the specific luminescent dopants set forth in claim 9. Hatwar does teach the luminescent layer comprises a blue dopant TPB (page 6, par. 85). Fukuoka teaches, in analogous art, a white light emitting device comprising a doped luminescent layer (see abstract and title). The Fukuoka luminescent layer is doped with blue perylene compound (see abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to have used perylene as the blue luminescent dopant in the Hatwar luminescent layer, because Hatwar desires a blue dopant in the luminescent layer and Fukuoka teaches perylene is well suited as a blue dopant for luminescent layers in white light-emitting EL devices. Although Hatwar teaches Alq and anthracene derivatives as luminescent host material, Hatwar fails to teach specifically one of the compounds in claims 13 as the luminescent material. Fukuoka teaches, in analogous art, DPVBi as a well performing host material for a doped light emitting layer in a white light-emitting device (see page 10, example 1). It would have been obvious for one of ordinary skill in the art at the time of the invention to use DPVBi as a luminescent host material in a doped luminescent layer for a white light-emitting device for increased

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device efficiency, because Fukuoka teaches DPVBi as the host of the luminescent layer results in an efficient white light-emitting device.

10. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hatwar (US 2003/0068524) in view of Howard et al. (US 2002/0021088). Hatwar is relied upon for the rejection of claims 1 and 10 as set forth above. Hatwar teaches the electron transporting layer adjacent the luminescent layer is doped with luminescent coumarin dye C545T green dopant in an amount of 0.12% by weight (see TABLE 1, page 7), but fails to teach the specific coumarin dye "coumarin 6" per instant claim 11. Howard et al. teaches, in analogous art, coumarin C545T and coumarin 6 are equivalent dye dopants (see pg. 1, par. 6). Accordingly, it would have been obvious to one of ordinary skill in the art to have used coumarin 6 in place of coumarin C545T in the Hatwar device and have expected similar luminescent properties, because coumarin 6 and coumarin C545T are art recognized equivalent coumarin dopants.

11. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hatwar (US 2003/0068524) in view of Mishima (US 2001/0053462). Hatwar is relied upon as set forth above for the rejection of claim 1. Claim 16 further requires an electron injecting layer interposed between the electron transporting layer and the cathode. Hatwar does teach a second electron transporting layer comprised of Alq between the doped electron transporting layer and the cathode (see TABLE 1, pg. 7, device #3), but fails to describe this second layer as an electron injecting layer. Mishima teaches, in analogous art, compounds such as 8-quinolinol derivatives ("Alq" is a 8-quinolinol derivative) are suitable as either electron transporting material or electron injecting

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material (see page 4, par. 37). It would have been obvious to one of ordinary skill in the art to have recognized the further function of electron injection by the Hatwar Alq layer between the doped electron transporting layer and the cathode, because Mishima teaches Alq is suitable as both an electron injecting and electron transporting material.

Allowable Subject Matter

12. Claims 2-5, 7, and 19-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The closest prior art is considered to Hatwar (US 2003/0068524), which discloses a white light-emitting EL device comprising a doped luminescent layer and a doped electron transporting layer. This reference, either alone or in combination with other art, fails to teach or to render obvious a relationship between the luminescence intensity of the electron transporting layer dopant and the luminescent host is proportional to the volume ratio of the luminescent dopant to the luminescent layer per instant claim 2. Also, Hatwar fails to teach or to render obvious a relationship between the luminescence intensity and the thicknesses of the layers per instant claims 5 and 21. Furthermore, Hatwar fails to teach or to render obvious luminescent material and doping material of the specific colors required by instant claims 7, 19, and 20.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dawn Garrett whose telephone number is (703) 305-0788. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached (703) 308-0449. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2351.


DAWN GARRETT
PATENT EXAMINER
TECHNOLOGY CENTER 1700

D.G.
June 13, 2003